

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 September 2003 (25.09.2003)

PCT

(10) International Publication Number
WO 03/078339 A1

(51) International Patent Classification?: **C03B 37/012**,
37/022, 37/02

(21) International Application Number: **PCT/GB03/00942**

(22) International Filing Date: **6 March 2003 (06.03.2003)**

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:
0205905.3 **13 March 2002 (13.03.2002)** **GB**

(71) Applicant (for all designated States except US): **UNIVERSITY OF SOUTHAMPTON [GB/GB]**; Highfield, Southampton, Hampshire SO17 1BJ (GB).

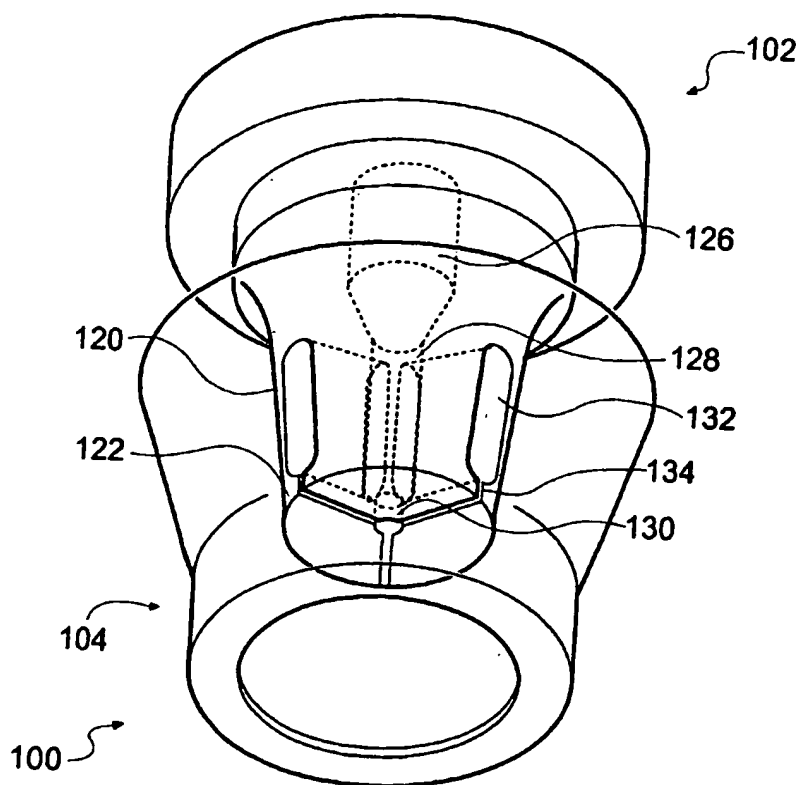
(72) Inventors; and

(75) Inventors/Applicants (for US only): **FRAMPTON, Kenneth, Edward [GB/GB]**; c/o Centre for Enterprise & Innovation, University Of Southampton, Highfield,

Southampton, Hampshire SO17 1BJ (GB). **HEWAK, Daniel, William [CA/GB]**; c/o Centre for Enterprise & Innovation, University of Southampton, Highfield, Southampton, Hampshire SO17 1BJ (GB). **KLANG, Kai, Ming [SG/DE]**; c/o Centre for Enterprise & Innovation, University of Southampton, Highfield, Southampton, Hampshire SO17 1BJ (GB). **MONRO, Tanya, Mary [AU/GB]**; c/o Centre for Enterprise & Innovation, University of Southampton, Highfield, Southampton, Hampshire SO17 1BJ (GB). **MOORE, Roger, Charles [GB/GB]**; c/o Centre for Enterprise & Innovation, University Of Southampton, Highfield, Southampton, Hampshire SO17 1BJ (GB). **RICHARDSON, David, John [GB/GB]**; c/o Centre for Enterprise & Innovation, University of Southampton, Highfield, Southampton, Hampshire SO17 1BJ (GB). **RUTT, Harvey [GB/GB]**; c/o Centre for Enterprise & Innovation, University Of Southampton, Highfield, Southampton, Hampshire SO17 1BJ (GB). **TUCKNOTT, John, Antony [GB/GB]**; c/o Centre for Enterprise & Innovation, University Of Southampton, Highfield, Southampton, Hampshire SO17 1BJ (GB).

[Continued on next page]

(54) Title: **FABRICATION OF MICROSTRUCTURED OPTICAL FIBRE**



(57) **Abstract:** Microstructured optical fibre is fabricated using extrusion. The main design of optical fibre has a core suspended in an outer wall by a plurality of struts. A specially designed extruder die is used which comprises a central feed channel, flow diversion channels arranged to divert material radially outwards into a welding chamber formed within the die, a core forming conduit arranged to receive material by direct onward passage from the central feed channel, and a nozzle having an outer part in flow communication with the welding chamber and an inner part in flow communication with the core forming conduit, to respectively define an outer wall and core of the preform. With this design a relatively thick outer wall can be combined with thin struts (to ensure extinction of the optical mode field) and a core of any desired diameter or other thickness dimension in the case of non-circular cores. As well as glass, the extrusion process is suitable for use with polymers. The microstructured optical fibre is considered to have many potential device applications, in particular for non-linear devices, lasers and amplifiers.

BEST AVAILABLE COPY



(74) Agents: HAINES, Miles, John et al.; D Young & Co, 21 New Fetter Lane, London EC4A 1DA (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.